



VSX-6153-V3

with

DM&P Vortex86SX
300MHz processor

Version 2.0

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Revision History

Revision	Date	Remark
1.0	Aug 1, 2010	First version released
2.0	Apr 25, 2025	V2 version released

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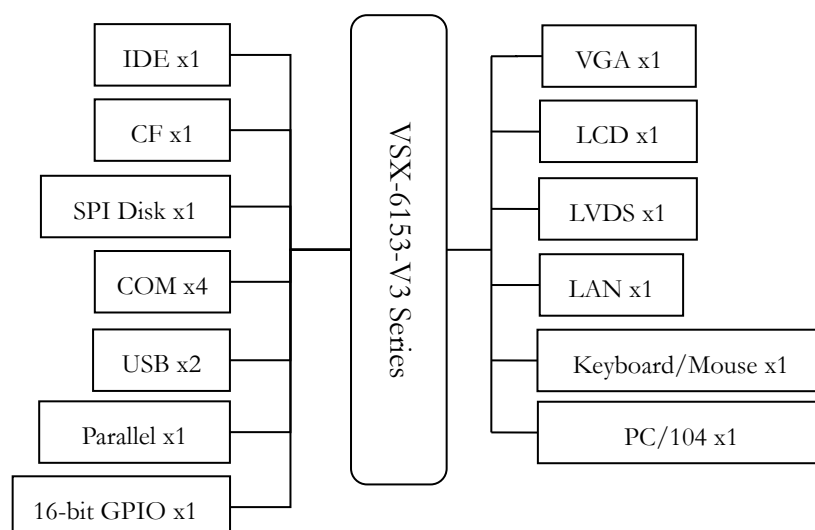
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General Information

1.1 Packing List

Product Name	Package	
VSX-6153-V3	VSX-6153-V3 board x1	LAN cable x1
	RS232 cable x4	GPIO cable x1
	Parallel cable x1	USB cable x1
	IDE cable x1	PS2KB x1
	PS2KB(TEST) x1	
VSX-6153-AU-V3	VSX-6153-AU-V3 board x1	GPIO cable x1
	RS232 cable x4	USB cable x1
	Parallel cable x1	PS2KB x1
	IDE cable x1	Mic-in cable x1
	PS2KB(TEST) x1	Line-out cable x1
	LAN cable x1	
VSX-6153S-V3	VSX-6153S-V3 board x1	LAN cable x1
	RS232 cable x4	GPIO cable x1
	Parallel cable x1	USB cable x1
	IDE cable x1	PS2KB x1
	PS2KB(TEST) x1	

1.2 Block diagram



1.3 Specifications

CPU	Vortex86SX 300MHz		
RAM	256MB DDR2 Onboard		
BIOS	AMI BIOS		
Bus	PC/104 standard compliant		
Display	SM712 Chipset with VGA, TFT-LCD, and 18-bit LVDS Flat Panel Interface VGA: Maximum resolution up to 1280 x 1024 @ 60Hz LVDS/TFT-LCD: Maximum resolution up to 1024 x 768 @ 60Hz		
LAN	Integrated 10/100Mbps Ethernet x1		
Audio	CM119B USB audio controller (Optional)		
Disk Support	IDE DoM	Compact Flash	Onboard 2MB SPI Flash
I/O Interface	RS232 x3	RS232/422/485 x1	Parallel x1
	USB2.0 x3	16-bit GPIO x1	
Connectors	2.54mm 4-pin pin header for +12V, -12V, -5V, GND x1 2.54mm 2-pin pin header for Reset x1 2.54mm 3-pin pin header for RS485 x1 2.54mm 104-pin PC/104 connector x1 2.54mm 5-pin header for Keyboard x1 2.54mm 5-pin header for Mouse x1 2.0mm 16-pin pin header for LVDS x1 2.0mm 44-pin box header for IDE x1 2.0mm 44-pin box header for LCD x1 2.0mm 26-pin box header for Parallel x1 2.0mm 20-pin box header for 16-bit GPIO x1 2.0mm 10-pin box header for RS232 x4 2.0mm 10-pin box header for USB x1 2.0mm 10-pin box header for VGA x1 2.0mm 8-pin header for Ethernet x1 Type I/II Compact Flash Slot x1		
Power Requirement	DC +5V @ 700mA		
Operating Temperature	-20°C - +70°C -40°C - +85°C (Optional)		
Dimension	90 x 96mm		
Weight	90g		
O/S Support	Windows Embedded CE6.0		Free BSD

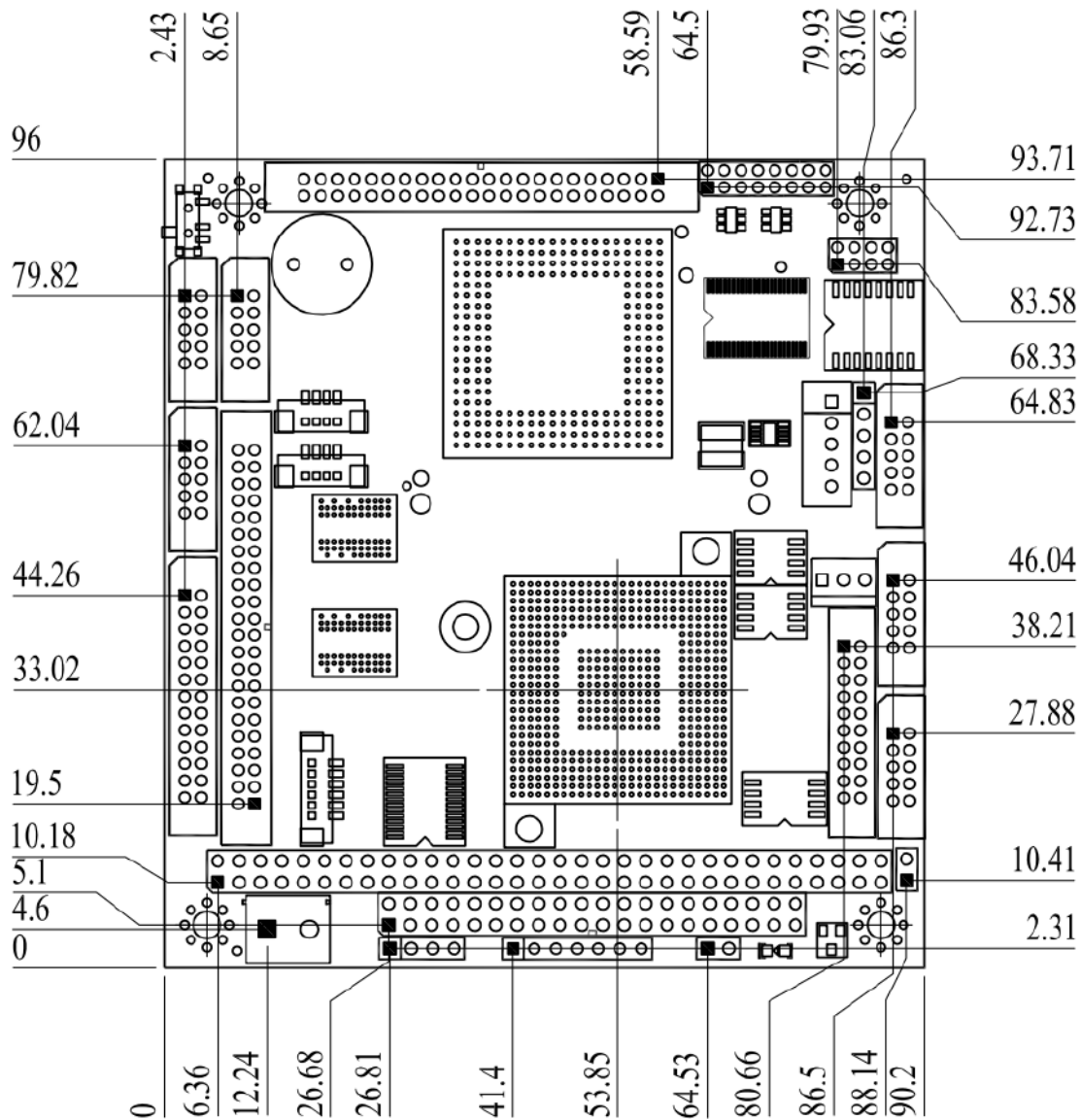
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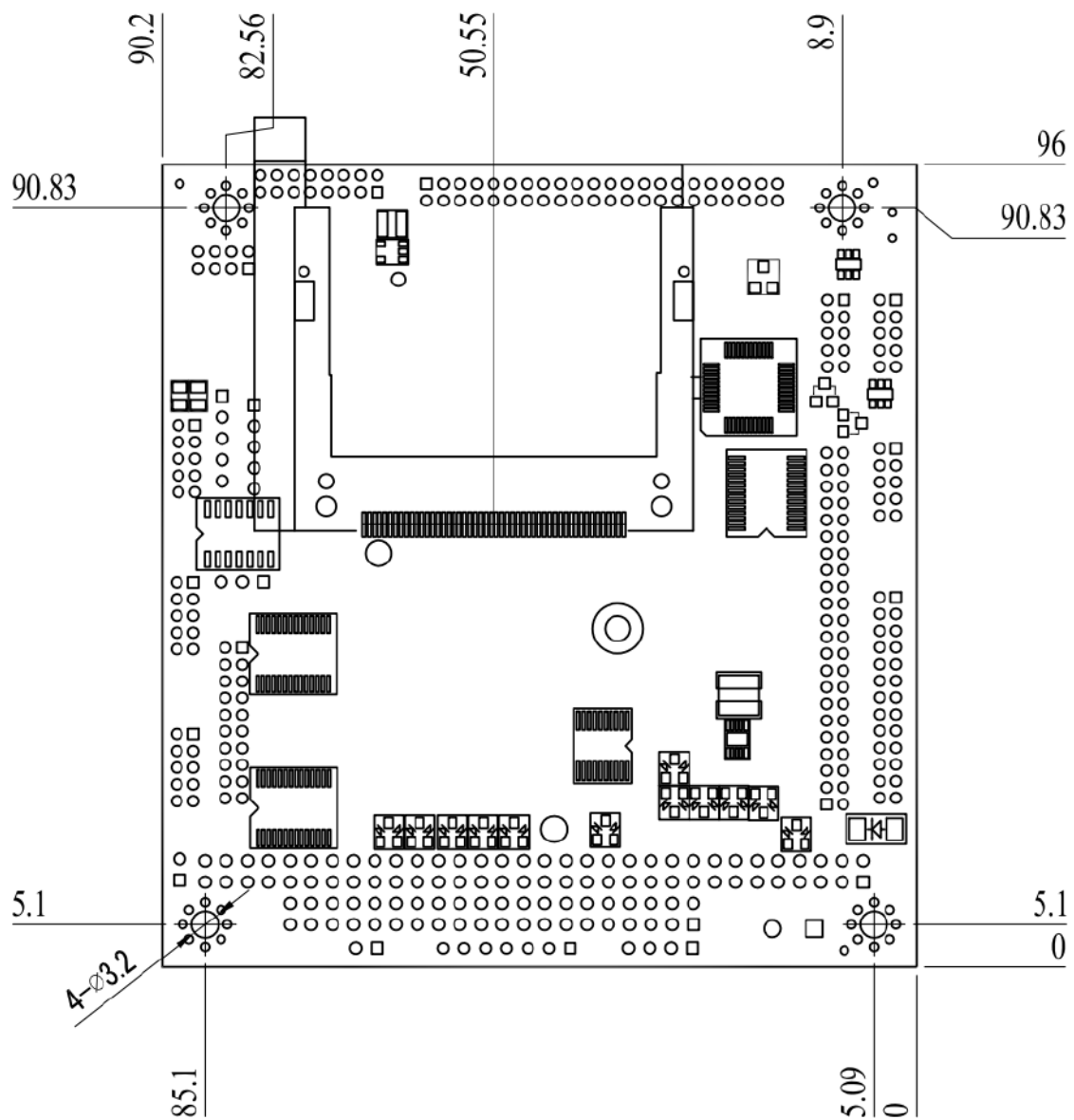
1.4 Ordering Information

PART NO.	VDX-6153-V3	VDX-6153S-V3
CPU (MHz)	300MHz	
DRAM (DDR2)	256MB	
Storage	IDE DoM Compact Flash SPI Flash	IDE DoM SPI Flash
Display	VGA, LVDS, TFT-LCD	VGA, TFT-LCD
Bus	PC/104	
LAN	1	
RS232	4	
RS485	1(Configurable from RS232)	
USB	2	
Parallel	1	
GPIO	16 bits	
Keyboard	1	
Mouse	1	
Audio	Line-out / Mic-in (Optional)	

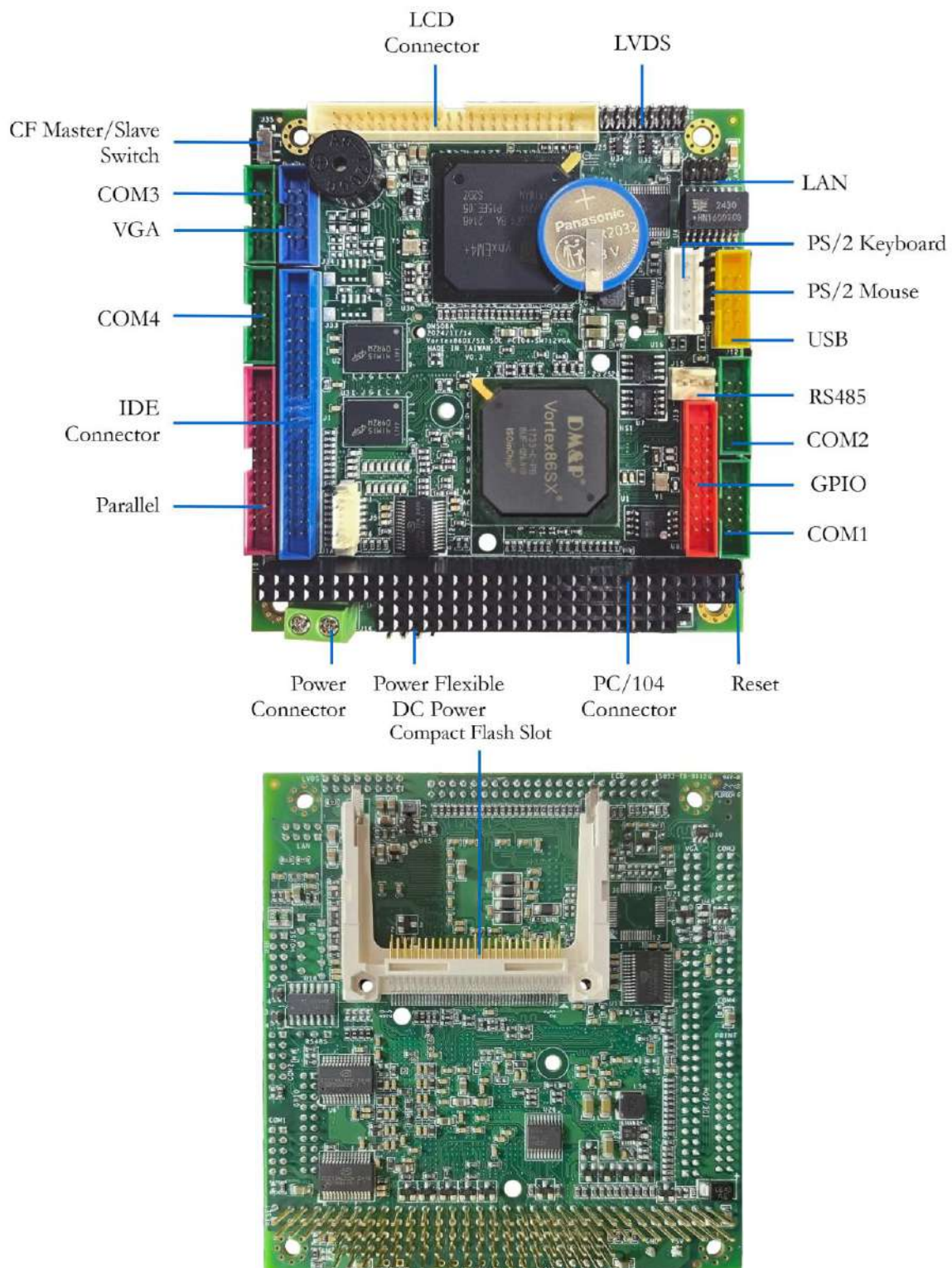
2 Hardware Information

2.1 Dimension





2.2 Board Outline and Connector Location



Note:

1. COM2 can be configured as RS232/422/485 in BIOS
2. J15 RS485 is only active when COM2 is configured as RS485 in BIOS.

2.3 Connector and Jumper Summary

Nbr.	Name	Type of Connections	Pin of Nbr.
J1	IDE	Box Header, 2.0mm, 22x2	44
J2	USB	Box Header, 2.0mm, 5x2	10
J4	LAN (R6040)	RJ45 connector	8
J6	Reset	Pin Header, 2.54mm, 1x2	2
J9	PS/2 Keyboard	Box Header, 2.54mm, 1x5	5
J10	PS/2 Mouse	Box Header, 2.54mm, 1x5	5
J11	COM1	Box Header, 2.0mm, 5x2	10
J12	COM2 (RS232/422/485)	Box Header, 2.0mm, 5x2	10
J15	RS485	Molex Header, 2.54mm, 3x1	3
J13	GPIO (P0/1 or PWMx16)	Box Header, 2.0mm, 10x2	20
J16	Power Connector	Terminal Block, 5.0mm, 2x1	2
J17	COM3	Box Header, 2.0mm, 5x2	10
J18	Parallel	Box Header, 2.0mm, 13x2	26
J19	COM4	Box Header, 2.0mm, 5x2	10
J20	PC104 Connector (64 pins)	Box Header, 2.54mm, 32x2	64
J21	PC104 Connector (40 pins)	Box Header, 2.54mm, 20x2	40
J22	4P Power Source (Interconnect to PC/104 –J20)	Pin Header, 2.54mm, 4x1	4
J25	LCD	Box Header, 2.0mm, 22x2	44
J33	Line-out (Optional)	Wafer, 1.25mm, 4x1	4
J34	MIC-in (Optional)	Wafer, 1.25mm, 4x1	4
J35	CF Master/Slave Switch		
J36	VGA	Pin Header, 2.0mm, 5x2	10
J37	LVDS	Pin Header, 2.0mm, 8x2	16
CF1	Compact Flash	Type I/II CF Slot	
PWR LED	Power Active LED (Red)		
IDE LED	IDE Active (Green)		
MTBF LED	MTBF LED (Orange)		
SP1	Buzzer		

2.4 Pin Assignments & Jumper Settings

J1: IDE

Pin#	Signal Name	Pin #	Signal Name
1	IDERST	2	GND
3	IDED7	4	IDED8
5	IDED6	6	IDED9
7	IDED5	8	IDED10
9	IDED4	10	IDED11
11	IDED3	12	IDED12
13	IDED2	14	IDED13
15	IDED1	16	IDED14
17	IDED0	18	IDED15
19	GND	20	NC
21	IDEREQ	22	GND
23	IDEIOW	24	GND
25	IDEIOR	26	GND
27	ICHRDY	28	GND
29	IDEACK	30	GND
31	IDEINT	32	NC
33	IDESA1	34	IDECBLID
35	IDESA0	36	IDESA2
37	IDECS-0	38	IDECS1
39	IDELED	40	GND
41	VCC	42	VCC
43	GND	44	NC

J2: USB

Pin#	Signal Name	Pin #	Signal Name
1	VCC	2	VCC
3	LUSBD0-	4	LUSBD1-
5	LUSBD0+	6	LUSBD1+
7	GND	8	GND
9	GGND	10	GGND

J4: LAN

Pin#	Signal Name	Pin #	Signal Name
1	TX+	2	TX-
3	RX+	4	LED0
5	LED0+	6	RX-
7	LED1+	8	LED1

J6: Reset

Pin#	Signal Name	Pin #	Signal Name
1	Reset	2	GND

J9: PS/2 Keyboard

Pin#	Signal Name	Pin #	Signal Name
1	KBCLK	2	KBDATA
3	NC	4	GND
5	VCC		

J10: PS/2 Mouse

Pin#	Signal Name	Pin #	Signal Name
1	MSCLK	2	MSDATA
3	NC	4	GND
5	VCC		

J11: COM1 (Optional: TTL/GPIO-P4/PWM x8)

Pin#	Signal Name	Pin #	Signal Name
1	DCD1	2	RXD1
3	TXD1	4	DTR1
5	GND	6	DSR1
7	RTS1	8	CTS1
9	RI1	10	GND

J12: COM2 RS232/422/485 (Optional: TTL)

Pin#	Signal Name	Pin #	Signal Name
1	DCD2/ 422TX-/ RS485-	2	RXD2/ 422TX+/ RS485+
3	TXD2/ 422RX+	4	DTR2 / 422RX-
5	GND	6	DSR2
7	RTS2	8	CTS2
9	RI2	10	NC

J13: GPIO (Port0/1 or PWM x16)

Pin#	Signal Name	Pin #	Signal Name
1	GND	2	VCC
3	GP00	4	GP10
5	GP01	6	GP11
7	GP02	8	GP12
9	GP03	10	GP13
11	GP04	12	GP14
13	GP05	14	GP15
15	GP06	16	GP16
17	GP07	18	GP17
19	VCC	20	GND

J15: RS485 (Auto direction)

Pin#	Signal Name
1	RS485+
2	RS485-
3	GND

J16: Power Connector

Pin#	Signal Name
1	+5V
3	GND

J17: COM3 (Optional: TTL)

Pin#	Signal Name	Pin #	Signal Name
1	DCD3	2	RXD3
3	TXD3	4	DTR3
5	GND	6	DSR3
7	RTS3	8	CTS3
9	RI3	10	NC

J18: Parallel

Pin#	Signal Name	Pin #	Signal Name
1	STB-	14	AFD-
2	PD0	15	ERR-
3	PD1	16	INIT-
4	PD2	17	SLIN-
5	PD3	18	GND
6	PD4	19	GND
7	PD5	20	GND
8	PD6	21	GND
9	PD7	22	GND
10	ACK-	23	GND
11	BUSY	24	GND
12	PE	25	GND
13	SLCT'	26	NC

J19: COM4 (Optional: TTL)

Pin#	Signal Name	Pin #	Signal Name
1	DCD4	2	RXD4
3	TXD4	4	DTR4
5	GND	6	DSR4
7	RTS4	8	CTS4
9	RI4	10	NC

J20: PC/104 Connector (64pins)

Pin#	Signal Name	Pin #	Signal Name
1	IOCHCHK*	2	GND
3	SD7	4	RESETDRV
5	SD6	6	VCC
7	SD5	8	IRQ9
9	SD4	10	-5V
11	SD3	12	DRQ2
13	SD2	14	-12V
15	SD1	16	OWS
17	SD0	18	+12V
19	IOCHRDY	20	GND
21	AEN	22	SMEMW*
23	SA19	24	SMEMR*
25	SA18	26	IOW*
27	SA17	28	IOR*
29	SA16	30	DACK3*
31	SA15	32	DRQ3*
33	SA14	34	DACK1*
35	SA13	36	DRQ1*
37	SA12	38	REFRESH*
39	SA11	40	SYSCLK
41	SA10	42	IRQ7
43	SA9	44	IRQ6
45	SA8	46	IRQ5
47	SA7	48	IRQ4
49	SA6	50	IRQ3
51	SA5	52	DACK2*
53	SA4	54	TC
55	SA3	56	BALE
57	SA2	58	VCC
59	SA1	60	OSC
61	SA0	62	GND
63	GND	64	GND

J21: PC/104 Connector (40pins)

Pin#	Signal Name	Pin #	Signal Name
1	GND	2	GND
3	MEMSC16*	4	SBHE*
5	IOCS16*	6	SA23
7	IRQ10	8	SA22
9	IRQ11	10	SA21
11	IRQ12	12	SA20
13	IRQ15	14	SA19
15	IRQ14	16	SA18
17	DACK0*	18	SA17
19	DRQ0	20	MEMR*
21	DACK5*	22	MEMW*
23	DRQ5	24	SD8
25	DACK6*	26	SD9
27	DRQ6	28	SD10
29	DACK7*	30	SD11
31	DRQ7	32	SD12
33	VCC	34	SD13
35	MASTER*	36	SD14
37	GND	38	SD15
39	GND	40	NC

J22: 4P Power Source (Power source from PC/104)

Pin#	Signal Name
1	-5v
2	-12V
3	+12V
4	GND

J25: LCD

Pin#	Signal Name	Pin #	Signal Name
1	+3.3V	2	+3.3V
3	LG2	4	LG3
5	LG4	6	LG5
7	NC	8	NC
9	LR0	10	LR1
11	LR2	12	LR3
13	LR4	14	LR5
15	GND	16	NC
17	NC	18	NC
19	NC	20	GND
21	NC	22	NC
23	LB0	24	LB1
25	LB2	26	LB3
27	LB4	28	LB5
29	NC	30	NC
31	LG0	32	LG1
33	GND	34	GND
35	NC	36	LCLK
37	NC	38	LDE
39	NC	40	LHSYNC
41	NC	42	LVSYN
43	LBACKL	44	LVDDEN

J33: Lint-out (Optional)

Pin#	Signal Name
1	LOUTR
2	GND
3	GND
4	LOUTL

J34: MIC-in (Optional)

Pin#	Signal Name
1	MICVREF
2	GND
3	GND
4	MIC-IN

J36: VGA

Pin#	Signal Name	Pin #	Signal Name
1.	R OUT	2	GND
3	G OUT	4	GND
5	B OUT	6	GND
7	HSYNC_A	8	GND
9	VSYNC_A	10	GND

J37: LVDS

Pin#	Signal Name	Pin #	Signal Name
1	VCC3	2	VCC3
3	GND	4	GND
5	Y0+	6	Y0-
7	Y1-	8	GND
9	GND	10	Y1+
11	Y2+	12	Y2-
13	CLK-	14	GND
15	GND	16	CLK+

2.5 System Mapping

Memory Mapping		
Address	Description	Usage
0000:0000 – 9000:FFFF	System RAM	*
A000:0000 – A000:FFFF	EGA/VGA Video Memory	*
B000:0000 – B000:7FFF	MDA RAM, Hercules graphics display RAM	*
B000:8000 – B000:FFFF	CGA display RAM	*
C000:0000 – C000:7FFF	EGA/VGA BIOS RAM	*
C000:8000 – C000:FFFF	Boot ROM Enable	*
D000:0000 – D700:FFFF	Expansion ROM Space	
D800:0000 – DB00:FFFF	SPI Flash Emulation Floppy A Enable	
DC00:0000 – DF00:FFFF	Expansion ROM Space	
E000:0000 – E000:FFFF	USB Legacy SCSI ROM Space	*
F000:0000 – F000:FFFF	Motherboard BIOS	*

I/O Mapping		
I/O Address	Owner	Usage
0000h – 000Fh	DMA 8237-1	*
0010h – 0017h	COM9	
0018h – 001Fh	Empty	
0020h – 0021h	PIC 8259-1	*
0022h – 0023h	6117D Configuration Port	*
0024h – 002Dh	Empty	
002Eh – 002Fh	Forward to LPC Bus	*
0030h – 003Fh	Empty	*
0040h – 0043h	Timer Counter 8254	
0044h – 0047h	Empty	
0048h – 004Bh	PWM Counter 8254	*
004Ch – 004Dh	Empty	
004Eh – 004Fh	Forward to LPC Bus	*
0050h – 005Fh	Empty	
0060h	Keyboard Data Port	*
0061h	Port B + NMI Control Port	*
0062h – 0063h	8051 Download 4K Address Counter	*
0064h	Keyboard Status Port	*

0065h	Watchdog 0 Reload Counter	*
0066h	8051 Download 8-bit Data Port	*
0067h	Watchdog 1 Reload Counter	*
0068h – 006Dh	Watchdog 1 Control Register	*
006Eh – 006Fh	Empty	
0070h – 0071h	CMOS RAM port	*
0072h – 0075h	MTBF counter	*
0076h 0 0077h	Empty	
0078h – 007Ch	GPIO Port 0, 1, 2, 3, 4 Default Setup	*
007Dh – 007Fh	Empty	
0080h – 008Fh	DMA Page Register	*
0090h – 0091h	Empty	
0092h	System Control Register	*
0093h – 0097h	Empty	
0098h – 009Ch	GPIO Direction Register	*
00A0h – 00A1h	PIC 8259-2	*
00A2h – 00BFh	Empty	
00C0h – 00DFh	DMA 8237-2	*
00E0h – 00FFh	Empty	
0100h – 0101h	GPCS1 Default Setting Address	*
0170h – 0177h	IDE1 (IRQ15)	
01Fh – 01F7h	IDE2 (IRQ14)	*
0278h – 027Fh	Printer Port (IRQ 7, DMA 0)	*
02E8h – 2EFh	COM4 (IRQ11)	*
02F8h – 02FFh	COM2 (IRQ3)	*
0376h	IDE ATAPI Device Control Write Only Register	*
03E8h – 03EFh	COM3 (IRQ 10)	*
03F6h	IDE0 ATAPI Device Control Write Only Register	*
03F8h – 03FFh	COM1 (IRQ4)	*
0480h – 048Fh	DMA High Page Register	*
0490h – 0499h	Instruction Counter Register	*
04D0h – 04D1h	8259 Edge/Level Control Register	*
0CF8h – 0CFFh	PCI Configuration Port	*
D400h – D4FFh	Onboard LAN	*
FC00h – FC05h	SPI Flash BIOS Control Register	*
FC08h – FC0Dh	External SPI Bus Control Register (Output pin configurable GPIO3 [0 -3])	*

IRQ Mapping		
IRQ#	Description	Usage
IRQ0	System Timer	*
IRQ1	Keyboard Controller	*
IRQ2	Cascade for IRQ8 - 15	
IRQ3	Serial Port 2	*
IRQ4	Serial Port 1	*
IRQ5	USB	*
IRQ6		
IRQ7	Parallel Port	*
IRQ8	Real Time Clock	*
IRQ9	USB / Ethernet 10/100M LAN	*
IRQ10	Serial Port 3	*
IRQ11	Serial Port 4	*
IRQ12	Mouse	*
IRQ13	Math Processor	*
IRQ14	Hard Disk Controller #1	*
IRQ15	USB	*

DMA Mapping		
DMA#	Description	Usage
DMA0		
DMA1		
DMA2	Floppy Disk Controller	*
DMA3		
DMA4		
DMA5		
DMA6		
DMA7		

2.6 Watchdog Timer

Two watchdog timers are equipped in Vortex86SX SoC. One is compatible with M6117D watchdog timer and the other one is new. The M6117D compatible watchdog timer is called WDT0 and the new one is called WDT1.

Sample code in DOS, Linux, and WinCE operating system is available. For more details, please refer the links <http://www.dmp.com.tw/tech> or <http://www.dmp.com.tw/tech/Vortex86SX/>

2.7 GPIO

40 GPIO pins are available on Vortex86SX. All GPIO pins are independent and can be configured as inputs or outputs, with or without pull-up/pull-down resistors.

Sample code in DOS, Linux, and WinCE operating system is available. For more details, please refer the links <http://www.dmp.com.tw/tech> or <http://www.dmp.com.tw/tech/Vortex86SX/>

2.8 SPI Flash

SPI Flash is often configured as a disk for booting up system or as floppy (A: Driver or B: Driver). Users may need to know how to do BIOS setup configuration for SPI flash and boot it up in DOS.

For technical support, please visit <http://www.dmp.com.tw/tech> or <http://www.dmp.com.tw/tech/Vortex86SX/>

2.9 PWM

Pulse-width modulation (PWM) of a signal or power source involves the modulation of its duty cycle, to either convey information over a communications channel or control the amount of power sent to a load.

The popular applications of pulse width modulation are in speed control of electric motors, volume control of Class D audio amplifiers or brightness control of light sources and many other power electronics applications.

The Vortex86SX SoC integrated 32 channels of PWM interface enabling the Automation, robotic industry to a New Age x86 SoC platform and we also offer the sample code of PWM which will guide the engineer to control the PWM functionality smoothly.

For more inquire of this sample code that please contact our sales team or mail to:

info@icop.com.tw

3 Driver Installation

VGA

The Vortex86SX processor also uses external Display chip “SM712” which is an ultra-low powered graphics chipset. It is capable in providing VGA display output up to 1280x1024. With LCD interface, developers could easily connect flat Panel to support TFT and LVDS output.

LAN

The Vortex86SX processor also integrated 10/100Mbps Ethernet controller that supports both 10/100BASE-T and allows direct connection to your 10/100Mbps Ethernet based Local Area Network for full interaction with local servers, wide area networks such as the Internet.

I/O and IRQ settings can be done by software with the supplied utility software, or it can be set for Plug and Play compatibility. The controller supports: Half / Full-Duplex Ethernet function to double channel bandwidth, auto media detection.

AUDIO

CM119B is a highly integrated single chip USB audio controller specifically for VoIP (Voice over internet protocol) application. All essential analog modules are embedded in CM119, including dual DAC and earphone driver, ADC, microphone booster, PLL, regulator, and USB transceiver. 8 GPIO pins can constitute a 24 key matrix directly support keypad control function without MCU.

Many features are programmable with jumper pins or external EEPROM. Vender can customize unique USB VID/PID to EEPROM for VoIP software authentication. Moreover, individual unique phone number for each device is possible via serial number stored in external EEPROM.

Operating system support

The Vortex86SX-6153-V3 PC/104 CPU board provides the VGA and LAN drivers for DOS 6.22 Windows CE 5.0 and CE 6.0.

For drivers support, please visit <http://www.dmp.com.tw/tech/Vortex86SX/>

4 Software Resources

4.1 ICOP Technical Resource Website

In the following website, you will find our latest user manuals, including OS support resources systems such as evaluation images for 32-bit Window operating systems. For details, please kindly visit the following link: <http://tech.icop.com.tw/>

For resource of 32-bit Linux operating systems, please directly contact us at info@icop.com.tw or contact your ICOP contact window.

Technical Support Directly from ICOP

To offer you more accurate and specific solutions for the technical situations you have, please prepare the information below before contacting ICOP:

- Product name and serial number
- Description of the H/W environment (i.e.: working temperature, I/O board information, information of connection between main board and IO boards, and/or other devices, etc)
- Description of the S/W environment (i.e: operating system, version, application software, and/or other related information, etc.)
- A detailed description and photos of the technical situation
- Any complement or technical situations you want ICOP more focusing on

User Manual Feedback

To make this user manual more complete, if you have any comments or feedbacks to this manual, please feel free to write to info@icop.com.tw or contact your ICOP sales representative.

Appendix

Flat Panel Wiring and Lighting

Hardware

Before you connect the TFT LCD Flat Panel with Vortex86SX-6353RD-V2, please make sure that the input Voltage of LCD is 3.3V or Not.

BIOS

Please contact or e-mail our regional sales to get the special BIOS for any TFT LCD Flat Panels.

Wiring LCD Cable

Please refer to Page 15 ([J25: LCD connector](#)). Or for more LCD lighting and integration service, please contact our regional sales or mail to info@icop.com.tw if you have any questions.

TCP/IP Library for DOS Real Mode

DSock is a TCP/IP library for DOS real mode, which is used by RSIP. It provides simple C functions for programmer to write Internet applications. ICOP also provide Internet examples using DSocket: BOOTP/DHCP, FTP server, SMTP client/server, HTTP server, TELNET server, Talk client/server, etc.

DSock provides a lot of example source code. Programmer can add Internet functions to their project easily and save development time. With a utility "MakeROM", programmer also can make a ROM image to fit their application, those examples can be seen in the following Application systems: Mity-Mite Serial Server, Web Camera Tiny Server and RSIP Serial Server.

DSock is free for All ICOP products using M6117D/Vortex86/Vortex86SX/Vortex86SX CPU and ICOP also provide the business version of DSocket for those customers who are using other x86 CPUs.

If you would like to use DSocket or business version of DSocket, Please mail to info@icop.com.tw or contact your regional sales.

Please download the trial DSocket software and Utilities from our website:
<http://www.dmp.com.tw/tech/dmp-lib/dsock/>

BIOS Default Setting

If the system cannot be booted after BIOS changes are made, Please follow below procedures in order to restore the CMOS as default setting.

- Press **“End”** Key, when the power on



- Press **** to enter the AMI BIOS setup
- Press **“F9”** to Load Optimized Defaults
- Press **“F10”** to Save configuration changes and exit setup

Warranty

This product is warranted to be in good working order for a period of one year (12 months) from the date of purchase. Should this product fail to be in good working order at any time during this period, we will, at our option, replace or repair it without additional charge except as set forth in the following terms. This warranty does not apply to products damaged by misuse, modifications, accident or disaster. Vendor assumes no liability for any damages, lost profits, lost savings or any other incidental or consequential damage resulting from the use, misuse of, originality to use this product. Vendor will not be liable for any claim made by any other related party. Return authorization must be obtained from the vendor before returned merchandise is accepted. Authorization can be obtained by calling or faxing the vendor and requesting a Return Merchandise Authorization (RMA) number. Returned goods should always be accompanied by a clear problem description. Should you have questions about warranty and RMA service, please contact us directly.

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